

CLAIMS

We claim:

1. An electronic device comprising:
a substrate;
an interconnected network of carbon nanotubes on the surface of the substrate; and
two or more electrical leads;
wherein the network forms an electrical connection between the leads.
2. The device of claim 1, wherein the carbon nanotubes are single-walled carbon nanotubes.
3. The device of claim 1, wherein the network is a sub-monolayer of carbon nanotubes.
4. The device of claim 1, wherein network is up to about 100 nm thick.
5. The device of claim 1, wherein the density of carbon nanotubes is at most about one thousand times the reciprocal of the square of the average length of the carbon nanotubes.
6. The device of claim 1,
wherein the network comprises metallic single-walled carbon nanotubes; and
wherein the density of the metallic single-walled carbon nanotubes is at most about the reciprocal of the square of the average length of the carbon nanotubes.
7. The device of claim 1, wherein the density of carbon nanotubes is at most about $10 \mu\text{m}^{-2}$.
8. The device of claim 1, wherein the density of the carbon nanotubes is at least about one tenth the reciprocal of the square of the average length of the carbon nanotubes.
9. The device of claim 1, wherein the density of the carbon nanotubes is at least about $0.3 \mu\text{m}^{-2}$.
10. The device of claim 1, wherein at least about 75% of the carbon nanotubes are at least partially in contact with the substrate.
11. The device of claim 1, wherein the network is semiconducting.
12. The device of claim 1, wherein the network has electrical properties that are related to the composition and density of the network.
13. The device of claim 1, wherein the network further comprises a filler material.
14. The device of claim 13; wherein one or more electrical properties of the filler material are altered by the network.
15. The device of claim 13, wherein the filler material is a polymer.
16. The device of claim 1, wherein the distance between the leads is greater than the average

length of the carbon nanotubes.

17. The device of claim 1, wherein the leads are on the surface of the substrate.
18. The device of claim 1, wherein the substrate is flexible.
19. The device of claim 1, further comprising a gate lead;
wherein the device is a field effect transistor;
wherein the leads electrically connected to the network form a source and a drain
of the transistor; and
wherein the network forms a conduction channel of the transistor.
20. The device of claim 19, further comprising an insulating material between the network
and the gate.
21. The device of claim 19, wherein the gate is part of the substrate.
22. The device of claim 19, wherein the transistor has an on-to-off ratio of at least about 10^5 .
23. The device of claim 19, wherein the substrate is flexible.
24. The device of claim 1,
wherein the network can be exposed to a gaseous sample; and
wherein the resistivity of the network changes in response to the presence of one
or more analytes in the sample.
25. The device of claim 24, wherein the substrate is flexible.
26. The device of claim 24, wherein substrate is a tube and the network is on the inside
surface of the tube.
27. The device of claim 26, wherein the tube comprises quartz.
28. The device of claim 24, wherein the electrical leads comprise silver.
29. A display device comprising the device of claim 1.
30. An electronic device comprising:
a substrate;
an interconnected network of nanofilaments on the surface of the substrate;
two or more electrical leads;
wherein the network forms an electrical connection between the leads.